symptoms to the list of camp fevers. It is a disease which has, without doubt, invaded our camps in many instances; but that it figured during the late war—simple or masked by malarial concomitants—as largely as we are called upon to believe by Dr. Woodward, has been shown by the writer to be exceedingly doubtful." In support of the opinion contained in the last clause of this passage, the author refers to his article in this Journal just cited.

Now, certainly the testimony of Assistant-Surgeon Smart, recorded in that article, is quite valuable as an addition to a great deal of other evidence of the same kind which tends to show the similitude that existed between the early stages of the majority of the camp fevers of the late war and ordinary malarial fevers; but he himself informs us (this Journal, Jan. 1878, p. 40) that he "saw many such cases in their inception, few comparatively at their termination." Had he been able to follow his fever patients to the hospitals of Alexandria and Washington, he would have learned that, in the great majority of the autopsies made in fatal cases, *unmistakable typhoid lesions* were recognized in the small intestine; and, had he extended his inquiries to the other general hospitals, he would have found that this was equally true of them all. In point of fact, the records of the post-mortem examinations of fever cases made during the civil war fully support the views I have heretofore expressed of the extreme frequency of the typhoid complication; and their publication (in the third medical volume of the *Medical and Surgical History of the War*) will convince the reader that the views expressed by my friend in the two papers to which I have just referred are inaccurate historically, and that their general acceptance would be pregnant with mischief in future wars.

ARTICLE III.

ON A NEW METHOD OF TREATING CHRONIC NASAL CATARRH.

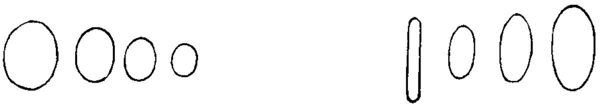
By HARRISON ALLEN, M.D., Professor of Physiology in the University of Pennsylvania.

IN the course of my clinical studies in chronic nasal catarrh, I have become interested in a method of local treatment which presents, in my opinion, decided advantages over those ordinarily employed. Method is, perhaps, too complimentary a term to use in speaking of the resources of the physician usually relied upon in treating this obstinate affection. Let me rather say that, in a treatment which has hitherto possessed but little or no method, I have endeavoured to institute one, that I have used with success—a few simple means of reaching and medicating the labyrinthine surfaces of the nasal chambers and the obscure region of the pharyngeal vault.

It is impossible to enter fully into the subject of the treatment of nasal catarrh without some consideration of the etiology of the affection. I will, therefore, briefly state my views of the causation of at least an important group of cases.

The nasal chamber being a modified portion of the respiratory tract, it follows that its functional integrity is dependent upon the freedom with which a current of air can pass through it.[1] Obstruction is fatal to its efficiency ; for not only is the sense of smelling lost, but the unconscious effort to breathe through the nose ordinarily causes congestion and distress, and at all times the normal outflow and distribution of mucus is interfered with. Nasal mucus has a tendency to flow backward. The gentle inclination of the floor of the nose from before backward, and the dip of the turbinated bones, determine this. Nasal obstruction interrupts this flow, and occasions accumulation and subsequent inspissation of mucus, or a reversal of the current, which results in escape of the secretion at the nostrils. If it is conceded that these statements are correct, all that becomes necessary to make their application to chronic nasal catarrh is to demonstrate the existence of obstruction in that affection. This is not difficult to do. The patient should be seated in front of the physician as though the laryngoscope was about to be employed; namely, by the side of a powerful lamp, the light of which is reflected, from a mirror on the brow of the physician, directly into the nostril. In order to illuminate properly the nasal chamber, a speculum is necessary. One may use Folsom's speculum as modified by myself,[2] or the ordinary vulcanite ear speculum modified by converting the round or oval opening into an elliptical one, as shown in figure 1. Such an instrument permits a deeper entrance to be effected than with a wider form—keeps the hairs of the nostril well out of the way, and protects the alæ from accidental contact of irritating drugs. In the normal nasal chamber the turbinated bones do not touch the nasal septum, neither do the middle or inferior turbinated bones impinge on each other, or the floor of the nose. Should, however, chronic nasal catarrh be present, the middle turbinated bone is often seen lying close against the septum, or the

Fig. 1.



Calibres of the aural specula.

Calibres of the nasal specula.

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[1] For limitation of this statement, with discussion as to the olfactory and respiratory values of the nasal chambers, see Dr. Wm. Ogle, Med.-Chir. Trans. vol. liii. 1870, p. 263.

[2] This simply comprises in soldering the vertical wire to the upper border of the lower flange. It thus permits a wider space for introduction of instruments. The instrument thus modified is for sale by Mr. Gemrig of this city.

inferior turbinated bone is found occluding the inferior meatus.[1] It must never be forgotten that the range of variation in the details of the normal nasal chamber is very great, and care must be exercised not to confound the foreshortening of a deflected yet healthy nasal septum, lying with its most prominent part in front of the inferior or middle turbinated bone, with the contact I have associated with the symptoms of one form at least of chronic nasal catarrh. Neither should the mere contact of the anterior portion of the middle turbinated bone against the septum be looked upon as of necessity an exciting cause of nasal catarrh. Not infrequently perfectly healthy persons will exhibit such contact over a small surface. But in such instances the contact is always found to be slight—the apposed surfaces barely touching—and a probe can be passed without pain or sense of obstruction. In the contact which has clinical significance I should expect firm pressure of the scroll and septum against one another, and some pain to follow manipulation.

When the point of contact is recognized, the indication for treatment is to destroy it. This is accomplished by means of local remedies applied to the mucous membrane at and about the places of contact, or, in examples of abnormal deflection of the nasal septum, by removal of the offending portions of bone. In the case of the inferior turbinated bone, the swollen and engorged tissues occupying the inferior meatus may be removed by the knife.

In carrying into effect the above rules of treatment, I have adapted several instruments to the special needs required. These I will now describe. To make topical applications to the interior of the nasal chamber, I employ a simple cotton carrier closely resembling the instrument in common use by the aurist. It consists of a single tapering rod of soft iron, slightly roughened at the smaller end for convenience of holding a pledget of absorbent cotton, and fixed in a small wooden handle at the other. A wooden handle is preferable to a metallic one, since the latter is liable to fall out of the nasal chamber from its own weight if the hand supporting it be removed for but a moment. It may be bent at an angle; the shape seen in figure 2 is the one ordinarily sufficing. The absorbent cotton can be steeped in any desired substance, and carried to the spot selected through the nasal speculum. The pledget of cotton should be moistened in water and warmed for an instant over the flame of the lamp.

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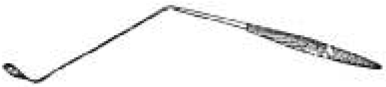
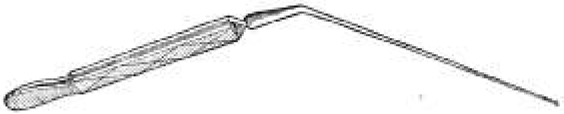
[1] It is well to remember that obstruction may occur either from a sentient surface being squeezed, or by the same surface on the opposite side, *i. e.*, in the other nasal chamber, extending its parts beyond the limit assigned by nature. Thus a deviation of the perpendicular plate of the ethmoid bone to the left may compress the left middle turbinated bone, or, if the turbinate of this side be small, it may escape compression, while the right turbinated bone may extend its natural limits, and, by following the receding septum, may actually press against it. It by no means follows, therefore, that obstruction is always met with upon the narrowed side, although this is very often the case. It is an observation every one has often repeated that the inferior turbinated bones grow downward, in cases of cleft palate, and in a measure occupy the space in the roof of the mouth. In the same way asymmetry of the lateral masses of the ethmoid bone is often associated with deviation of the perpendicular plate. When this deviation occurs slowly, or is congenital, the parts are adapted and the result is harmonious; when, however, it is acquired, it is liable to excite disturbance.

Fig. 2.



Thus prepared it does not irritate the mucous surfaces more than any other intruding solid substance. After employment of various agents, I have found the best results from a combination of tannic acid with carbolic acid or iodoform, held in suspense in gelatine.[1] The object of employing gelatine rather than water or spirit is to enable the medicine to remain for a long time in contact with the affected parts, and, in dissolving, to form a thick fluid which measurably imitates the consistency of the normal secretions of the parts. Thus syringing the nose with a simple fluid can have but a transient effect, while the medicine reaches perfectly healthy surfaces as well as the diseased ones. The method here recommended restricts the application to the spot where it is needed, and allows the medicine to slowly dissolve. I have often succeeded, in cases of pronounced contact between the septum and the anterior portion of the middle turbinated bone, in introducing a plate of gelatine, medicated with tannin and carbolic acid or other drug, into the space behind the point of contact. Here it would remain, if aptly lodged, for a period varying from an hour to half a day.

Fig. 3.



In some instances where much resistance is to be overcome, I have found it advantageous to introduce the gelatine plates with a pair of forceps, of the design shown in figure 3. In using this instrument, the blades should be so held as to spread from above downward. This enables the operator to manipulate the instrument freely, since the space between the septum and turbinates, while at all points narrow, is sufficiently high to enable the largest desired plate to be introduced and lodged with relative ease.

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[1] I append the formulæ of the preparations I ordinarily employ, which are made for me by Borell, of this city.

Stiff iodoform preparation, with geranium and carbolic acid : R. Pure carbolic acid, grs. v ; fluid ext. geranium maculatum, gtt. xv ; distilled glycerin, gtt. x ; powdered iodoform, ʒiijss ; French gelatine, ʒj ; water, a sufficient quantity. Dissolve the gelatine in a little water, then add the other ingredients, and rub to a smooth paste.

Stiff iodoform preparation without geranium : ℞. Pure carbolic acid, grs. v ; distilled glycerin, gtt. x ; powdered iodoform, ʒiijss ; French gelatine, ʒj ; water, a sufficient quantity. Dissolve the gelatine in a little water, then add the other ingredients, and rub to a smooth paste.

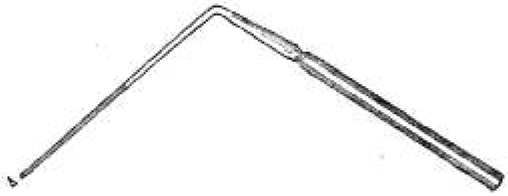
When it is desired to employ a powerful astringent, such as sulphate of copper or nitrate of silver—in a word, any fluid agent, the effect of which it is required to limit to a small space—the instrument shown in figure 4 may be employed. The instrument is a glass syringe fashioned after the plan of the hypodermic syringe, but much smaller. Attached to it is an adjustable nozzle bearing a long delicate pipe of gold or platinum. The medicine is drawn up in the syringe; the nozzle is fixed securely, and a pledget of absorbent cotton is wrapped round the free extremity of the latter. The pledget of cotton should be somewhat larger than that represented in the woodcut. Thus prepared the instrument is carried to the affected spot through the speculum, and the piston of the syringe pushed a sufficient distance to saturate the cotton. From one to two drops of the liquid is all that is necessary to accomplish this. The syringe is then allowed to remain in position long enough to insure a thorough application. By the time this has been accomplished, more or less mucus has collected about the spot; so that, when the instrument is withdrawn, the cotton, being enveloped in mucus, is so protected that no action upon the general mucous membrane of the nose is appreciable. The strongest applications can be employed in this way with perfect safety. I often employ nitrate of silver in saturated solution. Inspection subsequent to the application (in the event of silver being used) reveals, by the white patch of albuminate of silver at the spot touched, the accuracy of the method.

Fig. 4.

The above plans of treatment are as efficient in reaching the roof and sides of the naso-pharynx as the nose. The shafts of the instruments are of sufficient length to reach the most remote points. I have found that a perfectly straight cotton carrier or syringe pushed steadily through the inferior meatus, or the interval between the inferior turbinated bone and the septum, will reach the centre of the pharyngeal vault. If after this vantage the instrument be slowly drawn forward at the same time that it is kept in contact with the roof, it is felt after a little, in favourable tests, to slip upward. This upward motion is due to the probe passing from the pharynx into the nasal chamber directly in front of the sphenoidal sinus. In those forms of catarrh which are accompanied with marked occlusion of the nasal chamber between the septum and the anterior portion of the middle turbinated bone, the secretion is liable to accumulate in the upper portion of the nose. At the same time, owing to the morbid condition of the membranes which supervene upon such long-standing interference with the normal condition of the parts, the secretion becomes more or less inspissated. Such a locality cannot be reached by the unaided efforts of the patient, nor by the nasal douche, without the employment of a degree of force which would be dangerous to the integrity of the middle ear. The cotton carrier, employed as above indicated, will remove with ease such accumulations. I have repeatedly succeeded in bringing away large masses of tenacious semi-inspissated offensive mucus from an apparently perfectly clean nasal chamber immediately, after the most careful syringing and the fruitless use of the douche. It must be remembered that this region cannot be inspected either from in front through the speculum, or from behind by reflected light. After removal of the retained mucus, the surfaces can be medicated by the long-nozzled syringe—the same manipulation being employed, namely, to push the instrument through the nose into the pharynx, and then slowly withdrawing it, at the same time exerting a slight upward motion, until the end of the instrument slips to a higher plane, when it is known to be resting in front of the sphenoidal sinus.

I have already mentioned the fact that, among the causes of nasal irritation leading to chronic catarrh, abnormal deflection of the nasal septum is conspicuous. In some instances this is so pronounced as to prevent relief following any medication of the surfaces. This condition I have successfully met by cutting away the offending osseous projections. A knife (Fig. 5) has been devised which, being composed of a single piece of metal, as in a dental instrument (such as a plugger or chisel), is bent at a moderate angle and presents a double file-cutting edge anteriorly. The instrument can be introduced into the nose, and by a to-and-fro motion readily cuts or files down the yielding spicule-like projection.[1]

Fig. 5.



The detached figure at the end of the instrument represents a transverse section of the file-knife.

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[1] The instruments described were made by S. S. White, the well-known manufacturer of dental instruments, Philadelphia.

In illustration of the employment of the instruments and manipulations already given, I will now give abstracts of cases from my note-book.

CASE I.—T. M., aged 28, came under treatment Dec. 27, 1878; has suffered from chronic nasal catarrh for ten years. During this time had been under treatment, but with no result further than temporary improvement. Complains of sense of heat and fulness in the nose. Discharge abundant. Upon inspection with speculum, the inferior turbinated bone was seen in contact with the septum. The inferior turbinate touched the septum at the angle in the latter answering to the anterior end of the perpendicular plate of the ethmoid. By careful employment of the double angulated cotton carrier, contact between the middle turbinated bone and the septum is detected, although these parts were invisible, owing to the relation of the parts near the floor of the nose. The right side of the nose is larger than the left, and nowhere exhibits any contact of the turbinates with the septum. The patient cannot locate the trouble in either side of the nose, although it was evident that the mischief had its seat in the left side only. He cannot sleep on the right side, owing to the functional loss for respiratory purposes of this half of the nose, while the face is half-buried in the pillow.

Chronic follicular pharyngitis with engorgement of the adenoid tissue at the roof of the pharynx, coexisted with the above condition.

After the removal of the nasal discharge by the cotton-carrier, the post-nasal pharyngeal syringe, holding a weak solution of carbolic acid and fluid extract of geranium, was employed as a general cooling and slightly astringent wash to the irritated surfaces. After which, applications of nitrate of silver in saturated solution were made to the inferior turbinated bone, and plates of gelatine charged with iodoform were lodged in the nasal chamber *behind* the point of contact of the middle turbinated bone and the septum.

This treatment was continued twice a week; once a week an application of London paste was made to the roof of the pharynx.[1] The patient at once acknowledged improvement. The contact between the inferior turbinated bone and the septum was broken up, and inspection was permitted of the deeper parts of the nose. Improvement began at the time of the separation of these two surfaces. The contact between the middle turbinated bones and the septum was more obstinate, but in time also succumbed. Patient discharged February 17th, cured.

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[1] The employment in my hands of London paste in the treatment of adenoid disease of the roof of the pharynx has been followed uniformly by good results. When the pharynx is tractable the paste can be readily applied to any part of the naso-pharynx. The instrument is a simple rod of soft thick wire, which will enable the operator to press the free end into any curve desired. Finding by a little practice the curve that is best suited to the individual case, a small quantity of the paste is collected upon the cotton on the end of the wire, and, the patient holding the tongue down, the operator, placing the rhinal mirror in the oro-pharynx with one hand, with the unengaged hand inserts the wire in the oro-pharnyx, and being thus aided by reflected light he carries the paste (with entire freedom from the danger of touching healthy or sentient surfaces) to the place or places desired. The pain of such application to diseased glandular structures is not as severe as would be *à priori* supposed. In the majority of instances the patient makes no complaint, in others a slight sense of soreness and sense of heat alone ensues. When the pharanyx is so irritable as not to permit of this manipulation, I succeed in introducing the London paste through the nose to the roof of the pharynx, either through a Zaufal speculum, by means of a straight, small cotton carrier, or without protection of any kind if the nasal chamber be moderately capacious.

Case II.—S. W., aged 24. Has complained of nasal catarrh for a year. Came under treatment Dec. 4, 1878. On the right, which is the smaller, side contact at middle turbinated bone was detected. Nothing abnormal could be detected in the nasal chambers other than this point of contact. Existing with the catarrh, was a slight chronic pharyngeal and laryngeal inflammation requiring treatment. Local applications to the region of contact so far improved the parts that, by Dec. 30th, no contact existed, and the improvement was decided. Patient ceased reporting Feb. 27, 1879, relieved of his nasal difficulty.

Case III.—J. C. B., aged 40 years, who had suffered from nasal catarrh for many years, came under treatment Nov. 26, 1878. The discharge is not excessive, but is liable to follow abrupt changes of temperature, particularly those determined by passing from a warm to a cold room. She has been compelled to retire from the table owing to a sudden flow of secretion dependent upon the difference in the temperature of the dining-room and the room left a short time before. She has been much annoyed in the same manner upon entering a church or other uniformly warmed building in cold weather. The general health is good; no pharyngitis or laryngitis. Patient complains of a local dull ache at the root of the nose.

Upon examination, there was found on the right side of the nose close contact between the middle turbinated bone and the septum. The former was swollen and of a dull purplish colour. The left side of the nose was normal. The treatment consisted in making applications of saturated solutions of sulphate of copper to the surfaces of contact, and wedging in plates of gelatine and iodoform *above* and *behind* the point of contact. Improvement was almost immediately announced, and the patient was discharged cured March 6, 1879. She has since returned at long intervals with some slight return of the symptoms, but a single application was alone needed to relieve them.

Case IV.—C. S., aged 13, suffered from chronic nasal catarrh for three years. The discharge, which was chiefly pharyngeal, was copious. The patient referred his symptoms to the pharynx, complaining that his throat was sore, at the same time acknowledging a persistent slight pain at the root of the nose. The patient also suffers from functional heart disease. On the date of the first examination, Dec. 26, 1878, discovered contact between both the middle turbinated bones and the septum. Both inferior turbinated bones swollen and red. Applied saturated solution of nitrate of silver, by the syringe, to the region above points of contact and the under free surfaces of both middle turbinated bones. After two such applications, after an interval of three days, the pharynx and nose received a general application of the fluid extract of geranium and carbolic acid. Subsequently, a paste composed of iodoform and gelatine was applied to the upper surface of the nasal chambers, near the point of former contact. Patient ceased reporting Jan. 31st, very much improved. Returned March 24th, with the report that he had remained perfectly well for one month, at the end of which time symptoms slowly returned. The main features of former treatment were repeated, ending in improvement, which was probably permanent. The patient ceased reporting, and has been heard of indirectly through his parents as being well of his nasal difficulty.

Case V.—A. M. H., 70 years of age, has had nasal catarrh for fifteen months. It appears to have followed, or, at least, to have been coincident with, a fall from a horse. Complains of congestion of the head, dizziness, and neuralgic pain in the left side of the head and face; the pain being accurately limited to the terminal branches of the fifth nerve. The discharge is entirely from the left side of the nose.

Upon examining the nose, found the middle turbinated bone of left side pressing firmly against the septum. Extending upward and outward from the septum on a lower plane to the former, was a bony outgrowth almost entirely occupying the middle meatus. The inferior turbinated bone was normal. Inspissated discharge was found lodged between this exostosis and the middle turbinated bone. The pharynx irritable, with moderately enlarged swelling to the median side of the palato-pharyngeal folds. The roof of the pharynx occupied with tenacious discharge. The treatment was instituted Feb. 1, 1879, and consisted essentially of the application of agents already mentioned. The next visit upon the 3d of February, she reported improvement. An ointment of aconitia, one grain to the drachm, was ordered to be used upon the skin over the painful spots, in addition to the local remedies applied to the interior of the nose. Improvement continued steadily both in the discharge and the neuralgia until Feb. 25th, the pain now being restricted to only the left half of the lower lip. The discharge almost disappeared, the pharynx being entirely free, and a small quantity alone, of a whitish, semi-fluid character, lying upon the exostosis. The patient then passed from treatment for two weeks, at the end of which time she reported with the statement that the pain had gradually abated, notwithstanding there had been no treatment for a fortnight, the discharge remaining about the same. Another fortnight elapsed before she again reported, with the account that her symptoms were worse, the discharge had returned, the pain had been renewed, this time with a special tendency to location in the roof of the mouth. She accounted for these unfavorable conditions by having caught a fresh cold. It was now suggested to her that the treatment wonld probably remain palliative so long as the exostosis was permitted to remain in position in the nose, and she was advised to permit its removal; this, however, she declined. At a subsequent date, however, she permitted Dr. R. M. Smith, who was attending my patients during my absence from the city, to attempt to remove it, in which he was entirely successful, the file-knife already described, being the single instrument he required. The discharge after this operation almost immediately disappeared, without, however, permanently affecting the neuralgic pains. which persisted when the patient last reported.[1]

Enough has already been said, I trust, to show the efficacy of the above line of treatment, in cases of nasal catarrh which are associated with occlusion of one or more points of the nasal chamber. It is seen that improvement is apt to occur at the times when such occlusions disappear. In a word, the restoration of the nasal chamber to its proper use, *i. e.*, as a respiratory chamber, is often alone sufficient to cure the disease.

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[1] Since the notes of this case were put in type, I have received a letter from the patient giving a discouraging account of her health. Both the discharge and the pain had returned. I will allow the case to stand, however, for the following reasons: In the first place, it is the only case I have met with in which the symptoms appeared to follow an injury; second, the complication of the disease with obstinate facial neuralgia, which is most probably due to secondary inflammatory changes about the deep nerve trunk; third, because of the relief which followed treatment, the patient enthusiastically acknowledging the same.

A more difficult phase of the study of nasal catarrh presents itself when the occlusion is between the inferior turbinated bone, and the floor of the nose. In this class of cases improvement is more gradual, and recurrence more frequent, owing probably to the erectile character of the mucous membrane covering this bone. The same class of remedies, however, is valuable here as in contact between the middle turbinated bone, and the septum.

As I said in the beginning of this paper, pressure or occlusion within the nasal chamber accounts for a portion only of the cases of nasal catarrh as met with in practice. A variously defined group of cases is encountered in which the nasal chambers are everywhere capacious, and yield nowhere any abnormal contact. These are probably instances, when not local expressions of constitutional conditions, due to rhinitis, fluxes, the result of structural changes in the membrane itself, or the sequence of imperfectly guarded chambers, which permit the two free ingress of irritating currents of air, and thus the membranes are continually exposed to the contact of extraneous substances, and to abrupt changes in temperature. If the last reflection prove true, it will be seen that those nasal chambers that are either too narrow or too wide, are both liable to the same general affection.

The following case will serve as an illustration of catarrh associated with a capacious nasal chamber.

Case VI.—R., age 72, reported for treatment March 11, 1879. Suffered from nasal catarrh for two years. Is subject to attacks of paroxysmal sneezing. Comparative comfort ensues for a day or two thereafter. Upon examination of the nasal chambers, found the left side capacious, no contact anywhere; the right side contracted anteriorly but no obstruction noted. The trouble is referred to the left side entirely, in which a sense of obstruction, located high up is complained of. Contrary to the rule in such cases, no point of contact or occlusion can be detected upon the most careful examination. Under applications of extract of geranium and carbolic acid with post-nasal syringe continued improvement was acknowledged. By April 2d, all the symptoms were in abeyance, although the discharge had not entirely ceased. After this date, viz., April 2d, the trouble measurably left the nose, the symptoms being chiefly referable to the pharynx.

Toward the latter part of May, geranium and carbolic acid was discontinued, and fluid extract of ergot substituted. The obstruction at the root of the nose had, by this time, permanently disappeared, the discharge lessened, though the tendency to sneezing persists, together with a marked degree of pharyngeal irritation, which latter is gradually subsiding.

The instruments above described have been expressly designed to meet the necessities of cases in which there is undue narrowing of the interior of the nasal chamber. Thus, for example, it would be difficult if not impossible for a mass of the consistence of an ointment, or a base of the consistence of gelatine, to be retained in position any length of time when the dimensions of the chamber are normal or too wide.

In ozœna, the nasal chambers are, as a rule, not only capacious, but the turbinated bones are stunted, and the elements of the mucous membrane everywhere atrophied. I mention this specially, since no structural feature has hitherto been recognized in nasal catarrh, not present in the normal chamber; and my efforts have been directed to overcome, by appropriate manipulation, the structural peculiarities which I assume to exist. They have but an indirect value in any other class of nasal affections; nor do I intend that the treatment in any case should depend upon such manipulation. The history of every individual case should be carefully considered, and the true value of local and constitutional conditions borne in mind.

I propose adding to the foregoing clinical observations a few statements concerning the variations and occasional obstruction in the nasal chambers of the skeleton. The statements are deduced from the examination of 151 adult crania. While it is acknowledged that this number is inadequate to secure a satisfactory average, it may serve as a basis for an approximate estimate, and quite enough to establish the clinical fact, viz., that variations and resultant obstructions of the chambers are often met with.

Thus, out of 58 skulls preserved in the Wistar and Horner Museum, 18 only exhibited normal nasal chambers; in the remaining 37, 19 were narrowed on the left side and 21 on the right. It is a common observation that the nasal septum is rarely perfectly straight, but exhibits a slight inclination either to one side or the other. As an equally common observation, we may repeat the fact (the truth of which many recognize in their own persons), that breathing is much freer through one side of the nose than the other.

Owing to the composite nature of the nasal septum, its errors of position are not of one kind. Thus, deviations occur in the perpendicular plate of the ethmoid bone, at the ethmo-vomerine suture, and in the superior maxilla. In the living subject deviations are also seen in the triangular cartilage; but of the soft parts I do not now speak. Deviations of the perpendicular plate occur in the form of a slight bulging, and occurs commonly in such wise that the convexity of the curve is directed to the left side. Deviation of the superior maxilla occurs in the anterior part of the palatal process near the anterior nasal aperture, and, of course, upon that portion of the bone appearing at the triangular notch of the septum. This deflection lies directly within the nostril of the subject, and is very readily seen in clinical examinations. It is always acute, and exists in many skulls where the remaining portions of the septum are straight. Deviation at the ethmo-vomerine suture takes place behind the apex of the notch for the triangular cartilage. It rarely affects the suture far back, and never does so unless in continuity with the anterior deformation. The condition is strictly one of hyperostosis at the sutural line. It is commonly directed to the left, and has been often spoken of by writers as constituting the single form of septal deviation; hence the statement that the septum is generally inclined to the left. The growth may exist, however, from the side of a perfectly straight septum, a concavity not existing of necessity upon the opposite side.

The above-mentioned forms of deviation exist together or separately. When they exist together the perpendicular plate may be deflected to the right, the ethmo-vomerine excrescence to the left, and the maxillary spur to the right, or the first two may be directed to the left, and the vomerine to the right. Thus there may be within a single nasal chamber, three surfaces of abnormal character, each of which is capable of fretting swollen mucous surfaces.

To these general statements I will affix brief descriptions of a few crania, selected from the Wistar and Horner Museum, which yield points in confirmation of the above-named clinical statements. The numbers used are the cabinet numbers:—

3918. Process at ethmo-vomerine suture marked; maxillary spur present on both sides.

268. Remarkably strong process at the ethmo-vomerine suture, which almost touches the middle turbinated bone of the right side. There is a corresponding moderate concavity on the left side. Maxillary spur present, and directed to the right.

261. Perpendicular plate nearly straight, the slight inclination present being to the left; nevertheless, a close contact exists between it and the superior turbinated bone. The middle turbinated bone is mutilated.

104. The perpendicular plate is deflected to the left, and contact exists between it and the middle turbinated bone.

90. The ethmo-vomerine growth is directed to the right, and almost touches the corresponding middle turbinated bone.

266. The deflection is confined to the perpendicular plate, and is seen on the right side. The skull is remarkable for exhibiting a small exostosis on the corresponding middle turbinated bone, which lies in contact with the perpendicular plate.

3916. The ethmo-vomerine growth is large, and touches the left middle turbinated bone.

Skull without number in Dr. Neill's collection. The ethmo-vomerine growth touches the normal middle turbinated bone of the left side.

A second skull in the same collection. The ethmo-vomerine excrescence is very large; its free surface lies within the middle meatus.

It is thus found that among fifty-eight skulls collected for teaching purposes, and not supposed to possess any unusual, much less rare features, six exhibited contact between the superior and middle turbinated bones and the septum. In two, the contact, while not demonstrable, probably existed in the living subject, and in one the process of deflection escaped contact only by being lodged in the middle meatus.[1]

In the following crania, contact existed with very slight septal deviation, or none.

247. The left superior turbinated bone touched the septum.
98. The left middle turbinated bone deflected outward, and impinged upon the descending process (*processus Blumenbachii*).
In the skull marked 96 the perpendicular plate was straight, but both middle turbinated bones almost touched the septum, and in life it is very likely they did so touch.

There can be no doubt, therefore, that contact exists in a fair proportion of individuals. Is it of necessity a cause of irritation? The correct answer to this question probably lies within the following sentences: Persons who have irritable throats, and who therefore resist examination of the oral and vocal passages, would be likely to suffer from quickly induced obstruction in the nasal chambers; contrariwise, obstruction, if of slow origin, and happening in persons who have passive oral and vocal passages, may exist without creating sneezing, pain, or even discharge. As a rule, it may be said obstruction is followed by loss of function and distress; and when such obstruction exist, it should be removed when practicable.

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[1] Only those facts bearing upon the immediate object of the paper, secured by this examination, have been placed together in the text.

An interesting group of observations is here epitomized; some of which may possibly have relations to clinical conditions which have not been appreciated :—

(1) The posterior portion of the perpendicular plate of the ethmoid bone is always exceedingly thin and often more or less absorbed, since large irregular openings are met with. In one skull this portion of the plate was almost entirely destroyed; a mere ring of bone defining the position of the parts.

(2) In two examples the two middle turbinated bones had advanced toward one another and touched in the median line through a large septal perforation. The septum being intact at the posterior nares, it would be impossible to detect such a lesion with the rhinal mirror.

(3) While the foregoing conditions are seen, the vomer at the posterior nares is never deflected, and with exceeding rarity absorbed. I have seen but two examples of such absorption, or possibly imperfect development; one of these was seen in a patient by the rhinal mirror, the other in a cranium in the Wistar and Horner Museum.

(4) While the posterior portion of the perpendicular plate tends to be absorbed, the anterior tends to become thickened. This thickening is often accompanied with a peculiar chalky whiteness, a result probably of calcification of the triangular cartilage as it joins the perpendicular plate. This feature is more marked in the skull of the white race than in negroes, in whom indeed the plate may be thin throughout.

(5) Negroes, and probably all races other than the civilized whites, exhibit few examples of depletions of the septum. Thus out of 93 negro crania examined only 20 were deflected, and but three of these to any marked extent.

(6) In one cranium the palatal bones sent up nearly half way on either side of the vomer at the posterior nares a delicate process, which materially assisted in strengthening the septum at that place.